Amended Claims

Patent Claims

1. (Currently Amended) A filter ~~Filter~~ device for purification and/or for at least partial dealkization of raw water, ~~with~~ comprising a raw water inlet and a pure water outlet, with a filter line A, ~~comprised of~~ with one flow channel segment and a first filtration segment, and with a ~~dilution~~ blending line B, ~~comprised of~~ having an adjustable ~~dilution~~ distribution valve and a second filtration segment, which are connected by means of a distributor device with raw water inlet and by means of a connection device with a pure water outlet, whereby both filtration segments are arranged in an inner container, ~~characterized in that~~ ~~so that~~ whereby the flow characteristics of the ~~constituents~~ components of the ~~dilution~~ blending line B, defined by the pressure loss function $\Delta p_B(\dot{V}_B)$, is adapted, ~~according~~ to the flow characteristic of the components of the filter line A, defined by the pressure loss function $\Delta p_A(\dot{V}_A)$, in such a manner, that for at least one ~~dilution~~ blended portion X with $X = \dot{V}_B/(\dot{V}_A + \dot{V}_B)$, for volume flows between $\dot{V}_1 = 10$ $\dot{V}_2$ to 120 l/h (first volume flow range), for at least a second volume flow range with range width of at least 5 l/h within the first volume flow range, the ~~dilution~~ blend condition:

$$\frac{\left|\dot{V}_B \frac{1-X}{X} - \dot{V}_A\right|}{\dot{V}_A} \leq 0{,}15 = G \qquad \leq 0.15 = G$$

is satisfied, whereby G represents the threshold value of the ~~dilution~~ blended condition, $\Delta p_A(\dot{V}_A)$ the pressure loss in the filter line A and $\Delta p_B(\dot{V}_B)$ the pressure loss in the ~~dilution~~ blending line B, in dependence of the volume flows $\dot{V}_A$, $\dot{V}_B$ in [l/min] of water in the lines A and B.

2. (Currently Amended) The filter ~~Filter~~ device according to claim 1, ~~characterized in that~~ wherein the ~~dilution~~ distribution valve (20a) and the second filtration segment (20b) are designed in such a fashion that in the second volume flow range: $\Delta p_{B1}(\dot{V}_B) < \Delta p_{B2}(\dot{V}_B)$ is fulfilled, whereby $\Delta p_{B1}(\dot{V}_B)$ is the pressure loss function of the ~~dilution~~ distribution valve (20a) and $\Delta p_{B2}(\dot{V}_B)$ is the pressure loss function of the second filtration segment (20b).

3. (Currently Amended) The filter ~~Filter~~ device according to claim 1 ~~or 2~~, ~~characterized in that~~ wherein, in fully open state, the ~~dilution~~ distribution valve (20a) has a flow characteristic $\Delta p_{B1}(\dot{V}_B)$, which is adapted to the flow characteristic $\Delta p_{A1}(\dot{V}_A)$ of the flow channel segment (10a), and that the pressure loss functions $\Delta p_{A2}(\dot{V}_A)$ and $\Delta p_{B2}(\dot{V}_B)$ of the first and the second filtration segments (10b, 20b) are mutually adjusted, whereby the adjustment depends on the desired ~~dilution~~ blending.

4. (Currently Amended) The filter ~~Filter~~ device according to claim 3, ~~characterized in that~~ wherein the cross flow surface Q_A and Q_B, expressed in m^2, and the distances h_a and h_b, expressed in m, of the first and the second filtration segments (10b, 20b), are adjusted in such a way that, for the pressure loss function D_A and D_B, expressed in $kPah/m^3$, of the two filtration segments (10b, 20b), following relationship is satisfied:

$$D_A = \frac{X}{1-X} D_B$$

whereby

$$D_A = \int_0^{h_A} \frac{S_A(h)}{Q_A(h)} dh$$

$$D_B = \int_0^{h_B} \frac{S_B(h)}{Q_B(h)} dh$$

and S_A (h) and S_B(h), expressed in kPah/m^2, are the pressure loss coefficients of the filter materials.

5. (Currently Amended) The filter ~~Filter~~ device according to claim 4, ~~characterized in that~~ wherein, Q_A lies in the range of 5 cm^2 to 600 cm^2 and Q_B lies in the range of 1 cm^2 to 300 cm^2.

6. (Currently Amended) The filter ~~Filter~~ device according ~~to one of the claims~~ claim 1 ~~to 5~~, ~~characterized in that the~~ further comprising having filter material ~~of the~~ in filter line A and/or B ~~is~~ being filter ~~grist~~ granular material with average ~~corn~~ grain size in the range of 0.1 to 2 mm.

7. (Currently Amended) The filter ~~Filter~~ device according to ~~one of the~~ claim 1 ~~to 5~~, ~~characterized in that the~~ further comprising having filter material ~~of the~~ in filter line A and/or B ~~is~~ being a filter block with an average pore size in the range of 0.1 to 100 µm.

8. (Currently Amended) The filter ~~Filter~~ device according to ~~one of the claims~~ claim 1 ~~to 7~~, ~~characterized in that~~ wherein the outflow from the outlet of the second filtration segment (20b) flows into first filtration segment (10b).

9. (Currently Amended) The filter ~~Filter~~ device according to claim 8, ~~characterized in that~~ wherein the outflow from the outlet of the second filter segment (20b) flows into the second half of the first filtration segment (10b).

10. (Currently Amended) An inner ~~Inner~~ container for a filter device ~~according to one of the claims 1 to 9, characterized in that it has~~ [,] comprising a first filter chamber (54), in which a second filter chamber (55) is arranged, whereby each filter chamber (54, 55) is connected with a partial flow flowing in from above, and below both the filter chambers (54, 55) a common collection chamber (57) with pure water outlet (5) is arranged for collection of filtered partial flows..

11. (Currently Amended) The inner ~~Inner~~ container according to claim 10, ~~characterized in that~~ wherein at least one of the filter chambers (54, 55) is subdivided into at least two chamber segments (54a, 54b), in which different filter materials are arranged.

12. (Currently Amended) The inner ~~Inner~~ container according to claim 10 ~~or 11~~, ~~characterized in that in~~ wherein filter materials are arranged in the common collection chamber (57) and/or in the pure water ~~outer~~ outlet (5) ~~filter materials are arranged~~.

13. (Currently Amended) The inner ~~Inner~~ container according to ~~one of the claims~~ claim 10 ~~to 12~~, ~~characterized in that~~ wherein both the filter chambers (54, 55) extend up to the common collection chamber ~~main drainage pipe~~ (57), whereby the first filter chamber (54) surrounds the second filter chamber (55) in annular form.

14. (Currently Amended) The inner ~~Inner~~ container according to ~~one of the claims~~ claim 10 ~~to 13~~, ~~characterized in~~ **further comprising that** on the bottom wall (52) of the inner container (50), an annular drainage plate (71) with ~~filter~~ filtrate orifices (72) is mounted, which has radial collection channels (73) on the side facing the bottom wall (52), and a cupular insert chamber (70), extending upwards from the drainage plate (71).

15. (Currently Amended) The inner ~~Inner~~ container according to claim 14, ~~characterized in that~~ further comprising a double-walled pipe (60) ~~is~~ mounted in the lid (50).

16. (Currently Amended) The inner ~~Inner~~ container according to claim 15, ~~characterized in that the~~ wherein there is an outer pipe (61a) of the double-walled pipe (60) which projects into the first filter chamber (54).

17. (Currently Amended) The inner ~~Inner~~ container according to claim 16, ~~characterized in that~~ further comprising that the outer pipe (61a) has a distributor device (63) in the area of the first filter chamber (54), for distribution of the inflowing water.

18. (Currently Amended) The inner ~~Inner~~ container according to claim 17, ~~characterized in that~~ wherein the distributor device (63) has nozzles (62) encircling the perimeter of the outer pipe (61a).

19. (Currently Amended) The inner ~~Inner~~ container according to ~~one of the claims~~ claim 10 ~~to 18~~, ~~characterized in that~~ wherein the first filter chamber (54) is filled at least with ion exchanger resin.

20. (Currently Amended) The inner ~~Inner~~ container according to ~~one of the claims~~ claim 10 ~~to 19~~, ~~characterized in that~~ wherein the second filter chamber (55) is filled at least with activated carbon.

21. (New) The filter device according to claim 2, wherein, in fully open state, the ~~dilution~~ distribution valve (20a) has a flow characteristic $\Delta p_{B1}(\dot{V}_B)$, which is adapted to the flow characteristic $\Delta p_{A1}(\dot{V}_A)$ of the flow channel segment (10a), and that the pressure loss functions $\Delta p_{A2}(\dot{V}_A)$ and $\Delta p_{B2}(\dot{V}_B)$ of the first and the second filtration segments (10b, 20b) are mutually adjusted, whereby the adjustment depends on the desired ~~dilution~~ blending.

22. (New) The filter device according to claim 21, wherein the cross flow surface Q_A and Q_B, expressed in m^2, and the distances h_a and h_b, expressed in m, of the first and the second filtration segments (10b, 20b), are adjusted in such a way that, for the pressure loss function D_A and D_B, expressed in $kPah/m^3$, of the two filtration segments (10b, 20b), following relationship is satisfied:

$$D_A = \frac{X}{1-X} D_B$$

whereby

$$D_A = \int_0^{h_A} \frac{S_A(h)}{Q_A(h)} dh$$

$$D_B = \int_0^{h_B} \frac{S_B(h)}{Q_B(h)} dh$$

and S_A (h) and S_B(h), expressed in kPah/m^2, are the pressure loss coefficients of the filter materials.

23. (New) The inner container according to claim 13, further comprising that on the bottom wall (52) of the inner container (50), an annular drainage plate (71) with ~~filter~~ filtrate orifices (72) is mounted, which has radial collection channels (73) on the side facing the bottom wall (52), and a cupular insert chamber(70), extending upwards from the drainage plate (71).

24. (New) The inner container according to claim 18, wherein the first filter chamber (54) is filled at least with ion exchanger resin.

25. (New) The inner container according to claim 18, wherein the second filter chamber (55) is filled at least with activated carbon.